

# intel® 440MX Mobile Platform

Performance Brief

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## 1.0 Introduction

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This report provides a comparison of test results from the 440BX and the 440MX chipsets on Spectrum of Performance for the Intel 400-MHz and 450-MHz mobile Pentium III Processors while using the PCI graphics controller.

The Intel® 440MX is the first single chipset solution for mobile platforms. The Intel 440MX has been optimized to support the mobile Pentium® II processor or the mobile Celeron™ processor system bus at 66-MHz speed and the 100-MHz version that supports the mobile Pentium III processors. This report contains the benchmark information for the 100-MHz version.

The Intel 440MX integrates the traditional two-chip solution into a single-chip solution. The traditional two-chip solution is also known as the North Bridge and the South Bridge. The basic architecture of this chipset comes from the Intel 440BX and the PIIX4E PCIset. The major difference is that the 440MX does not support the AGP interface. For a detailed description of other feature differences between the 440BX and the 440MX chipsets, refer to their specific datasheets on the Intel Website. While reducing the total chip count and board real estate to enable low-cost mobile system design, the 440MX delivers the equivalent performance of the 440BX chipset while using the PCI graphic controller.

Since the 440MX does not support the AGP interface, to have a fair comparison between the 440BX and the 440MX chipsets and to focus on the chipset and overall system performance comparison, Intel has used the same PCI graphic controller for both tested platforms. In addition, Intel has used the same peripheral devices between the two systems. A list of detailed system configurations is also included in Appendix A.

Another major feature in the 440MX is the AC '97 link interface, which is not supported in the 440BX chipsets. However, this report only provides the Intel's Spectrum of Performance comparison. For specific performance information on the AC '97 soft technology, refer to the *Intel® 440MX AC '97 Power/Performance Application Note*.

Today's Intel architecture platform performance can be best assessed using the Spectrum of Performance:

- **Productivity Benchmarks** simulate the activities of end users working in typical productivity applications such as word processing, spreadsheets, presentation applications, and personal finance programs.
- **Multimedia Benchmarks** are designed specifically to simulate the activities of end users utilizing video, digital sound, PC imaging or video conferencing, and other similar media-rich applications.
- **3D/Floating-Point Benchmarks** measure the performance of three-dimensional visualization techniques such as those used in games to support richer textures and enhanced lighting effects.
- **Internet Technology Benchmarks** evaluate processor Internet performance on browser, 3D, and multimedia technologies.

Representative productivity benchmarks include processor-level benchmarks such as CPUmark\*99 and SPECint\*95 and system-level benchmarks such as SYSmark\*98 and Winstone\* 99.

Representative multimedia benchmarks include MultimediaMark\* 99 from FutureMark\* Corp., Intel MMX™ Technology Applications, and Intel Media Benchmark.

Representative 3D/floating-point benchmarks include the FPU WinMark\* of WinBench\*99 and 3D Winbench\*99 from Ziff-Davis\*, 3DMarkCPU from Futuremark\*, and SPECfp base\*95.

Representative Internet benchmarks include the productivity, 3D, and multimedia benchmarks listed above. Additionally, some Java Internet technology benchmarks are JMark\*2.0 Processor Test for a processor-level benchmark and SYSmark\*J for a system-level benchmark.

For more detailed information about the Spectrum of Performance, refer to Intel's Website.

- Productivity: Processor level benchmark - SPECint95, system level benchmark- Business Winstone 99
- Multimedia: MultimediaMark 99
- 3D/Floating-Point: SPECfp\_base95 and WinBench99 - FPU WinMark
- Internet: JMark 2.0

## 2.0 Spectrum of Performance

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### 2.1 Productivity Benchmarks

#### 2.1.1 System Level Benchmark: Business Winstone 99

Winstone 99 is a system-level, application-based benchmark developed by Ziff-Davis. Winstone 99 measures a PC's overall performance when running Windows-based, 32-bit applications on Windows\* 98 or Windows\* NT 4.0. It runs real 32-bit business suites through a series of scripted activities and uses the time a PC takes to complete those activities to produce its performance scores. Winstone 99 includes both high-end suite and business suite tests.

Business Winstone 99 incorporates the following popular office software suites: Corel WordPerfect Suite 8\*, Lotus SmartSuite\*, and Microsoft Office\* 97. To mirror the typical usage patterns of today's PC users, the benchmark keeps multiple applications open within each suite and switches tasks between these applications and the Netscape Navigator \*Internet browser (Ziff-Davis).

### 2.2 3D/Multimedia Benchmarks

The MultimediaMark99 is a system-level benchmark from FutureMark Corp. that measures audio, video, and imaging performance. MultimediaMark 99 is a benchmark that focuses on testing multimedia performance of a modern PC in a "real world" environment.

### 2.3 Floating-Point Benchmarks

#### 2.3.1 WinBench99 - FPU WinMark

Business WinBench99 is a subsystem-level benchmark that measures the performance of a PC's graphics, disk, processor, video, and CD-ROM subsystems in a Windows-based environment. WinBench99's tests are all 32-bit and can only run on Windows 95 and Windows NT systems. The FPU WinMark components of this benchmark are used for comparing floating-point performance in this report. The WinBench99 FPU WinMark benchmark measures the performance of the processor floating-point subsystem, which is used for such tasks as 3D graphics rendering and scientific calculations. This synthetic benchmark was developed by Ziff-Davis. The test consists of five algorithms: 3D graphics operations, fast Fourier transforms (FFT), calculation of planetary orbitals, calculation of areas of polygons, and Gauss-Jordan elimination of a coefficient matrix of linear equations. The benchmark reports a single score based on the weightings that Ziff-Davis has assigned to the component algorithms.

## 2.4 Internet Technology Benchmarks

Jmark 2.0 is a benchmark developed by Ziff-Davis to measure processor Java performance. The Jmark 2.0 Processor Test stresses the Java Virtual Machine (JVM) on a non-graphical workload.

## 2.5 Summary

As illustrated in Figure 1, while running in a 400-MHz or a 450-MHz mobile Pentium III processor system with a PCI graphic controller, the 440MX delivers equivalent performance as the 440BX chipset. This is shown across the Spectrum of Performance benchmarks that we have selected.

**Figure 1. 440BX vs. 440MX on the 400-MHz and the 450-MHz Mobile Pentium III Processor with PCI Graphics Benchmark Results**

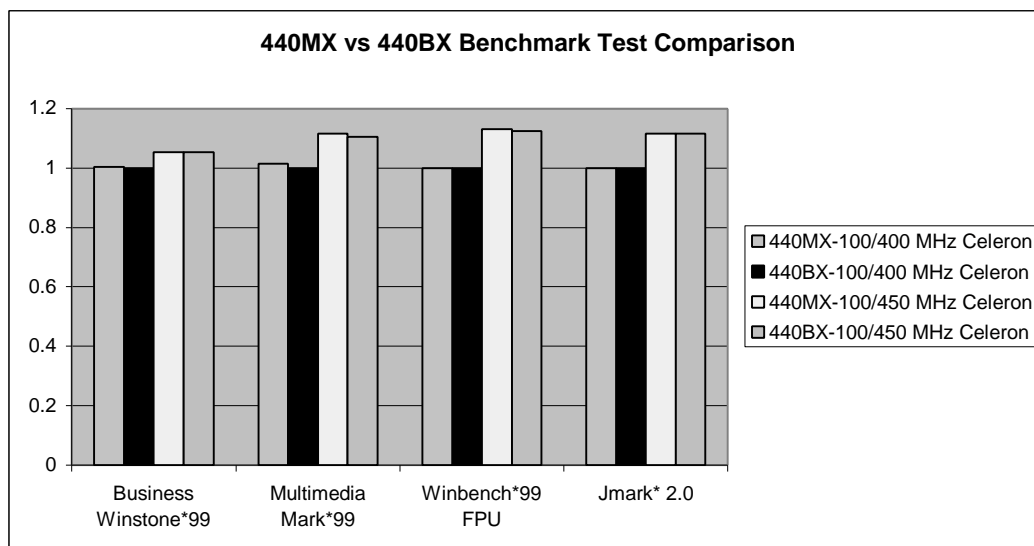


Table 1 summarizes the Spectrum of Performance results for the chart discussed above.

**Table 1. 440BX vs. 440MX on the 400-MHz and the 450-MHz Mobile Pentium III Processor with PCI Graphics Benchmark Results**

Processor	Business Winstone 99	Multimedia Mark 99	Winbench99 FPU	Jmark 2.0
440MX-100 Platform with Mobile 400-MHz Pentium III Processor	1.00	1.01	1.00	1.00
440BX-100 Platform with Mobile 400-MHz Pentium III Processor	1.00	1.00	1.01	1.00
440MX-100 Platform with Mobile 450-MHz Pentium III Processor	1.05	1.12	1.13	1.12
440BX-100 Platform with Mobile 450-MHz Pentium III Processor	1.05	1.10	1.12	1.12

## Appendix A — System Configurations

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Table 2 shows the systems and their configurations used for evaluating the benchmark performances discussed in this brief.

**Table 2. System Configurations**

System	Intel 440BX-100 MHz Platform	Intel 440MX-100 MHz Platform
<b>Processors</b>	Intel mobile Pentium III processors (400 MHz, 450 MHz)	Intel Mobile Pentium III processors (400 MHz, 450 MHz)
<b>Motherboard</b>	Intel MHPG internal 440BX motherboard	Intel MHPG internal 440MX motherboard
<b>Host CPU External Bus Speed</b>	100 MHz	100 MHz
<b>Chipset/speed</b>	Intel 82443BX/100 MHz	Intel 82443MX/100 MHz
<b>BIOS</b>	Phoenix	Phoenix
<b>AMP/ACPI</b>	Disabled	Disabled
<b>System Memory Size/Speed</b>	64-Mbytes SDRAM (PC100)	64-Mbytes SDRAM (PC100)
<b>Motherboard Chip Set</b>	Intel 82443BX	Intel 82443MX100
<b>Hard Disk</b>	2.1 GB	2.1 GB
<b>Media</b>	24X CD-ROM	24X CD-ROM
<b>Operating System</b>	Windows 98 for Winstone 99, MultimediaMark and Winbench 99 FPU,	Windows 98 for Winstone 99, MultimediaMark and Winbench 99 FPU
<b>Sound</b>	ESS Maestro-2EM	ESS Maestro-2EM
<b>PCI Video Controller</b>	ATI Rage Pro PCI graphics controller (800x600x64)	ATI Rage Pro PCI graphics controller (800x600x64)